

**UNIVERSITY COAL RESEARCH /  
HISTORICALLY BLACK COLLEGES AND UNIVERSITIES  
AND OTHER MINORITY INSTITUTIONS  
CONTRACTORS REVIEW MEETING**

**AGENDA**

**Tuesday, June 4, 2002**

7:00 - 8:00 a.m.      Registration and Continental Breakfast

**Opening Session – Marquis C**

8:00 - 9:00 a.m.      Opening Remarks  
**Robert Bedick, Director Fuels and Energy Efficiency Projects Division**  
**U.S. Department of Energy, National Energy Technology Laboratory**

Keynote Speaker  
**Thomas Sarkus, Director Coal Power Projects Division**  
**U.S. Department of Energy, National Energy Technology Laboratory**

**Session A – Marquis C**

**Moderator: Kamalendu Das, U.S. Department of Energy, National Energy Technology Laboratory**

9:00 - 9:35 a.m.      The Forcing of Mercury Oxidation as a Means of Promoting Capture  
**John Kramlich, University of Washington**

9:35 - 10:10 a.m.      Mercury Oxidation in Non-Thermal Barrier Discharge System  
**Virendra K. Mathur, University of New Hampshire**

10:10 - 10:25 a.m.      **Break**

10:25 - 11:00 a.m.      A Novel Method for the Removal of Trace Concentration of Elemental Mercury from Utility Emissions  
**John Katz, Johns Hopkins University**

11:00 - 11:35 a.m.      Quantification of Mercury in Flue Gas Emissions Using Boron-Doped Diamond Electrochemistry  
**A. Manivannan, West Virginia University**

11:35 - 1:00 p.m.      **Lunch (on your own)**

**Moderator: Paula Flenory, U.S. Department of Energy, National Energy Technology Laboratory**

1:00 - 1:35 p.m.      Synthesis of Sulfur-Based Water Treatment Agent from SO<sub>2</sub> Waste  
**Robert C. Brown, Iowa State University**

- 1:35 - 2:10 p.m.      High Efficiency Desulfurization of Synthesis Gas  
**Douglas P. Harrison, Louisiana State University**
- 2:10 - 2:45 p.m.      Kinetics of Direct Oxidation of H<sub>2</sub>S in Coal Gas to Elemental Sulfur  
**Kyung C. Kwon, Tuskegee University**
- 2:45 - 4:45 p.m.      **Poster Session – City Center A and B**

## **Session B – Marquis B**

**Moderator: Susan Maley, U.S. Department of Energy, National Energy Technology Laboratory**

- 9:00 - 9:35 a.m.      A Novel Sensor and Measurement System for Fireside Corrosion Monitoring in Coal-Fired Boilers  
**Heng Ban, University of Alabama at Birmingham**
- 9:35 - 10:10 a.m.      A Novel Integrated Stack Approach for Realizing Mechanically Robust Solid Oxide Fuel Cells  
**Scott A. Barnett, Northwestern University**
- 10:10 - 10:25 a.m.      **Break**
- 10:25 - 11:00 a.m.      Understanding Olivine CO<sub>2</sub> Mineral Sequestration Reaction Mechanisms at the Atomic Level: Optimizing Reaction Process Design  
**Michael J. McKelvey, Arizona State University**
- 11:00 - 11:35 a.m.      Development of Superior Sorbents for Separation of CO<sub>2</sub> from Flue Gas at a Wide Temperature Range During Coal Combustion  
**E.P. Reddy, University of Cincinnati**
- 11:35 - 1:00 p.m.      **Lunch (on your own)**

**Moderator: Suresh Jain, U.S. Department of Energy, National Energy Technology Laboratory**

- 1:00 - 1:35 p.m.      Experimental & Computer Simulation Studies of CO<sub>2</sub> Sequestration in Coalbeds  
**Muhammad Sahimi, University of Southern California**
- 1:35 - 2:10 p.m.      Active Carbonation: A Novel Concept to Develop an Integrated CO<sub>2</sub> Sequestration Module for Vision 21 Plants  
**M. Mercedes Maroto-Valer, The Pennsylvania State University**
- 2:10 - 2:45 p.m.      Molecular Basis for Carbon Dioxide Sequestration in Coal  
**Jeffrey D. Evanseck and Jonathan Mathews, Duquesne University**
- 2:45 - 4:45 p.m.      **Poster Session – City Center A and B**

**Wednesday, June 5, 2002**

7:00 – 8:00 a.m. Registration and Continental Breakfast

**Session A – Marquis C**

**Moderator: Arun Bose, U.S. Department of Energy, National Energy Technology Laboratory**

8:00 - 8:35 a.m. Integrating P-Wave and S-Wave Seismic Data to Improve Characterization of Oil Reservoirs  
**Innocent Aluka, Prairie View A&M University**

8:35 - 9:10 a.m. Water-Gas Shift with Integrated Hydrogen Separation Process  
**Maria Flytzani-Stephanopoulos, Tufts University**

9:10 - 9:45 a.m. Flux Enhancement in Cross Flow Membrane Filtration: Fouling and Its Minimization by Flow Reversal  
**Shamsuddin Ilias, North Carolina A&T State University**

9:45 - 10:20 a.m. Ceramic Membranes for Hydrogen Production from Coal  
**George R. Gavalas, California Institute of Technology**

10:20 - 10:35 a.m. **Break**

10:35 - 11:10 a.m. Proton-Conducting Dense Ceramic Membranes  
**Y.S. (Jerry) Lin, University of Cincinnati**

11:10 - 11:45 a.m. Fundamental Investigation of Fuel Transformations in Advanced Coal Combustion and Gasification Technologies  
**Joseph M. Calo, Brown University**

11:45 - 12:20 p.m. Coal Particle Flow Patterns for O<sub>2</sub> Enriched, Low NO<sub>x</sub> Burners  
**Jennifer L. Sinclair, Purdue University**

12:20 p.m. **Adjourn**

**Wednesday, June 5, 2002**

**Session B – Marquis B**

**Moderator: John Stipanovich, U.S. Department of Energy, National Energy Technology Laboratory**

- 8:00 - 8:35 a.m.      Determination of Solid-Liquid Equilibria Data for Mixtures of Heavy Hydrocarbons in a Light Solvent  
**Richard Roehner, University of Utah**
- 8:35 - 9:10 a.m.      VLE Measurements and Modeling for Asymmetric Mixtures of Hydrocarbons  
**Mark C. Theis, Clemson University**
- 9:10 - 9:45 a.m.      Removal of Dibenzothiophenes from Petroleum Feedstocks Using Extraction and Adsorption Processes  
**Robert J. Angelici, Iowa State University**
- 9:45 - 10:20 a.m.      Deep Desulfurization of Diesel Fuels by a Novel Integrated Approach  
**Chunshan Song, The Pennsylvania State University**
- 10:20 - 10:35 a.m.      **Break**
- 10:35 - 11:10 a.m.      Studies on the Synthesis of Mesoporous Materials as Potential Petroleum Upgrading Catalysts  
**Conrad Ingram, Clark Atlanta University**
- 11:10 - 11:45 p.m.      Novel Preparation and Magneto Chemical Characterization of Nano-Particle Mixed Alcohol Catalysts  
**Upali Siriwardane, Grambling State University/Louisiana Tech University**
- 11:45 - 12:20 p.m.      Iron Catalyts for Slurry Phase Fischer-Tropsch Synthesis  
**Dragomir B. Bukur, Texas A&M University**
- 12:20 p.m.              **Adjourn**

**POSTER PRESENTATIONS OF PROJECT ACCOMPLISHMENTS  
1999 AWARDS**

Advanced Computational Model for Three-Phase Slurry Reactors

**Goodarz Ahmadi, Clarkson University**

Advanced Diagnostic Techniques for Three-Phase Bubble Column Reactors

**Muthanna H. Al-Dahhan, Washington University**

Development of Attrition-Resistant Iron-Based Fischer-Tropsch Catalysts

**K. Jothimurugesan, Hampton University**

Palladium/Copper Alloy Composite Membranes for High Temperature Hydrogen Separation from Coal-Derived Gas Streams

**Robert McCormick, Colorado School of Mines**

Water-Gas Shift Kinetics at Membrane Reactor Conditions

**Carl Lund, SUNY-Buffalo**

Separation of Hydrogen and Carbon Dioxide Using a Novel Membrane Reactor in Advanced Fossil Energy Conversion Processes

**Shamsuddin Ilias, North Carolina A&T State University**

Engineering a New Material for Hot Gas Cleanup

**Thomas D. Wheelock, Iowa State University**

Sampling, Analysis, and Properties of Primary PM<sub>2.5</sub> :Application to Coal-Fired Utility Boilers

**Allen Robinson, Carnegie Mellon University**

Contribution of Semi-Volatile Organic Material to PM<sub>2.5</sub>

**Delbert J. Eatough, Brigham Young University**

The Development of Improved Catalysts for Selective Catalytic Reduction of Nitrogen Oxides with Hydrocarbons

**Ates Akyurtlu, Hampton University**

Control of Interfacial Dust Cake to Improve Efficiency of Moving Bed Granular Filters

**Robert C. Brown, Iowa State University**

Electrostatically Enhanced Barrier Filter Collection

**John Erjavec, University of North Dakota**

High Temperature Removal of H<sub>2</sub>S from Coal Gasification Process Streams Using an Electrochemical Membrane System

**Alan Burke, Georgia Institute of Technology**

Experimental and Theoretical Determination of Heavy Oil Viscosity Under Reservoir Conditions

**Jorge Gabitto, Prairie View A&M University**

Study of Activation of Coal Chars

**Indrek Kulaots, Brown University**

Development of Activated Carbons from Coal Combustion By-Products  
**Harold Schobert, The Pennsylvania State University**

Using Computational Modeling for Brine/CO<sub>2</sub> Sequestration  
**Thomas J. Dick, Duquesne University**

#### **ABSTRACTS OF 2001 AWARDS**

Development of Advanced Solid State Sensor Technology Base for Vision 21 Systems  
**Chater D. Stinespring, West Virginia University**

Novel Electrode Materials for Low-Temperature Solid Oxide Fuel Cells (SOFCs)  
**Meilin Liu, Georgia Institute of Technology**

First Principles Analysis of the Elementary Reaction Paths for Fischer Tropsch Synthesis over Co and Ru  
**Matthew Neurock, University of Virginia**

Modeling of Syngas Reactions and Hydrogen Generation Over Sulfides  
**Kamil Klier, Lehigh University**

Selective Oxidation of CO on Metal Foam Catalysts  
**James J. Spivey, North Carolina State University**

Nanostructured Ceramics and Composites for Refractory Applications in Coal Gasification  
**Paul Brown, Pennsylvania State University**

Dynamic Testing of Gasifier Refractories  
**Michael D. Mann, University of North Dakota**

Novel Nanocomposite Membrane Structures for H<sub>2</sub> Separations  
**Benny D. Freeman, University of Texas at Austin**

Combined Microbial Surfactant-Polymer System for Improved Oil Mobility and Conformance Control  
**Jorge Gabitto, Prairie View A&M University**

The Impact of Trace Additive on the Apparent Solubility of Hydrogen  
**Jalal Abedi, Clark Atlanta University**

Characterization of Heterogeneities at the Reservoir Scale: Spatial Distribution and Influence on Fluid Flow  
**Michael R. Gross, Florida International University**

Attrition Resistant Ion-Based Catalysts for FT SBCRs  
**Adeyinka Adeyiga, Hampton University**

CO<sub>2</sub> Sequestration and Recycle by Photosynthesis with Visible Light  
**Steven S.C. Chuang, University of Akron**

Enhancing the Atomic-Level Understanding of CO<sub>2</sub> Mineral Sequestration Mechanisms via Advanced Computational Modeling  
**Andrew Chizmeshya, Arizona State University**

Reforming of Liquid Hydrocarbons in a Novel Hydrogen-Selective Membrane-Based Fuel Processor  
**Shamsuddin Ilias, North Carolina A&T State University**

Passive Control of Particle Dispersion in a Particle-laden Circular Jet using Elliptic Co-annular Flow  
**Ahsan R. Choudhuri, University of Texas, El Paso**

Numerical Simulation of a Natural Gas-Swirl Burner  
**Ala Qubbaj, University of Texas, Pan American**

Supported Dense Ceramic Membranes for Oxygen Separation  
**Timothy L. Ward, University of New Mexico**

Development of a Novel Radiatively/Conductively Stabilized Burner for Significant Reduction of  $\text{NO}_x$  Emissions and for Advancing the Modeling and Understanding of Pulverized Coal Combustion and Emissions  
**Noam Lior, University of Pennsylvania**

An Innovative Concept for  $\text{CO}_2$ -Based Tri-Generation of Fuels, Chemicals, and Electricity Using Flue Gas in a Vision 21 Plant  
**Chunshan Song, The Pennsylvania State University**